WHAT IS CLAIMED IS:

1. An optical switch having a plurality of switch cells, wherein:

said optical switch has n inputs (n is a natural number) and m outputs (m is a natural number);

said optical switch has a unit size defined as the distance between any two adjacent ones of said switch cells;

said optical switch comprises:

a substrate having a switch size of K x L (K is an integer satisfying $n \leqq K$, and L is an integer satisfying $m \leqq L$);

first and second mirrors parallel to each other and perpendicular to a principal surface of said substrate; and

an optical unit providing a plurality of input optical paths for said n inputs and a plurality of output optical paths for said m outputs, said plurality of input optical paths being inclined relative to said first and second mirrors, said plurality of output optical paths being inclined relative to said first and second mirrors; and

each of said switch cells comprises a switch mirror provided movably relative to said substrate.

2. An optical switch according to claim 1, wherein each switch cell switches between a first condition where said switch mirror is parallel to said principal surface of said substrate and a second condition where said switch mirror is perpendicular to said principal surface of said substrate.

3. An optical switch according to claim 1, wherein:

said plurality of switch cells comprise n x m switch cells;

said n x m switch cells being provided at n x m lattice positions on said principal surface.

4. An optical switch according to claim 1, wherein n = m = K = L.

5. An optical switch according to claim 1, wherein said plurality of input optical paths comprise odd-numbered channels and even-numbered channels crossing each other, and said plurality of output optical paths comprise odd-numbered channels and even-numbered channels crossing each other.

6. An optical switch according to claim 1, wherein said plurality of input optical paths are parallel to each other, and said plurality of output optical paths are parallel to each other.

7. An optical switch according to claim 6, wherein n ones of said switch cells connected to said n inputs are alternately inverted in logic, and m ones of said switch cells connected to said m outputs are alternately inverted in logic.

8. An optical switch according to claim 1, wherein:

n = m = K, L = n + 1, and n is an even number; and

when K and L represent the number of rows and the number of columns, respectively, said optical switch further comprises n lenses provided in the (n/2 + 1)-th column.

9. An optical switch according to claim 8, wherein each of said n lenses comprises a spherical lens.

10. An optical switch according to claim 1, wherein:

n = m = K, L = n + 1, and n is an odd number; and

when K and L represent the number of rows and the number of columns, respectively, said optical switch further comprises n lenses provided in the [(n + 1)/2 + 1]-th column.

11. An optical switch according to claim 10, wherein each of said n lenses comprises a spherical lens.

12. An optical switch according to claim 1,

wherein:

n = m = K, and L = n + 1; and

when K and L represent the number of rows and the number of columns, respectively, said optical switch further comprises n lenses provided in an arbitrary one of said columns.

13. An optical switch according to claim 1, wherein:

n = m, K = n + 1, and L = n + 2; and

said optical switch further comprises 2n lenses provided substantially along a diagonal line of said principal surface.

14. An optical switch according to claim 13, wherein each of said 2n lenses comprises a rod lens.

15. An optical switch according to claim 6, wherein said plurality of switch cells comprise n first switch cells connected to said n inputs and at least (n^2 - 1) second switch cells provided relatively near to said m outputs.

16. An optical switch according to claim 15, wherein:

each of said first switch cells switches the corresponding input optical path into between a first optical path including reflection on said first mirror

and a second optical path not including reflection on said first mirror; and

each of said second switch cells is located so as to correspond to each of said first and second optical paths, and determines a final optical path reaching each output.

17. An optical switch according to claim 15, wherein:

the positions of said first switch cells are expressed in the form of (row, column) as (i, 1); i = 1 to n; and

the positions of said second switch cells are expressed in the form of (row, column) as:

(n/2 + i, 2(n - 1) - n/2 + 1 - i); i = 0 to (n - 1)

(n/2 + i, 2(n - 1) - n/2 + 2 - i); i = 0 to (n - 1)

(n/2 + i + 1, 2(n - 1) - n/2 + 1 - i); i = 0 to (n - 1)

(n - 1 + i, 2(n - 1) - i); i = 0 to (n - 1)

(n + i, 2(n - 1) - i); i = 0 to (n - 1).

18. An optical switch according to claim 15, wherein K = L = 2(n - 1).

19. An optical switch according to claim 15, wherein K = L = 2n - 1.

20. An optical switch according to claim 19, wherein said at least $(n^2 - 1)$ second switch cells become

substantial when the number of said second switch cells are equal to or greater than n^2, whereby said second mirror becomes unnecessary.

21. An optical switch according to claim 15, wherein K = L = 2n.

22. An optical switch according to claim 21, wherein said at least (n^2 - 1) second switch cells become substantial when the number of said second switch cells is equal to or greater than n^2, whereby said second mirror becomes unnecessary.

23. An optical switch according to claim 15, wherein said optical switch further comprises a plurality of lenses provided between said first switch cells and said second switch cells.

24. An optical switch according to claim 23, wherein each of said plurality of lenses comprises a rod lens.

25. An optical switch according to claim 23, wherein said plurality of lenses comprise 2n lenses.

26. An optical switch according to claim 23, wherein:

n is less than 6;

said principal surface of said substrate has an excess space; and

said plurality of lenses are provided in said excess space.

27. An optical switch according to claim 23, wherein:

n is greater than 5; and

said plurality of lenses are provided on said principal surface of said substrate.

28. An optical switch according to claim 1, wherein:

K = L = n + 1 = m + 1; and

said plurality of switch cells are provided at (n + 1) x (n + 1) lattice positions on said principal surface of said substrate.

29. An optical switch according to claim 28, wherein:

said plurality of switch cells comprise first switch cells and second switch cells;

said switch mirror in each of said first switch cells is oriented in a first direction; and

said switch mirror in each of said second switch cells is oriented in a second direction opposite to said first direction.

30. An optical switch according to claim 29, wherein said optical switch further comprises a plurality

of lenses provided between said first switch cells and said second switch cells.

31. An optical switch according to claim 30, wherein each of said lenses is a rod lens.

32. An optical switch according to claim 1, wherein said optical switch further comprises a lens provided on said substrate.

33. An optical switch according to claim 1, wherein n = m.

34. An optical switch comprising:

a plurality of optical path switching means arranged so as to arbitrarily guide light from a plurality of input ports to a plurality of output ports, each of said plurality of optical path switching means having a movable optical reflecting member; and

reflecting means for reflecting light from said input ports or light from said optical reflecting members toward said output ports or said optical reflecting members.

35. An optical switch comprising:

a plurality of optical path switching means arranged so as to arbitrarily guide light from a plurality of input ports to a plurality of output ports, each of said plurality of optical path switching means

having a movable optical reflecting member;

all the optical path lengths from said input ports to said output ports being equal.

36. An optical switch comprising:

a plurality of optical path switching means arranged so as to arbitrarily guide light from a plurality of input ports to a plurality of output ports, each of said plurality of optical path switching means having a movable optical reflecting member;

all the optical losses from said input ports to said output ports being equal.

37. An optical switch comprising:

a plurality of optical input ports;

a plurality of optical output ports;

a plurality of optical path switching means provided between said plurality of optical input ports and said plurality of optical output ports, each of said plurality of optical path switching means having a movable optical reflecting member; and

reflecting means provided outside of said plurality of optical path switching means between said plurality of optical input ports and said plurality of optical output ports for reflecting light from said optical input ports or light from said optical path switching means.

38. An optical switch comprising:

a plurality of optical input ports;

a plurality of optical output ports;

a plurality of optical path switching means provided between said plurality of optical input ports and said plurality of optical output ports, each of said plurality of optical path switching means having a movable optical reflecting member; and

reflecting means provided between said plurality of optical input ports and said plurality of optical output ports so as to interpose said plurality of optical path switching means for reflecting light from said optical input ports or light from said optical path switching means.

39. An optical switch comprising:

a plurality of optical input ports;

a plurality of optical output ports; and

a plurality of optical path switching means provided between said plurality of optical input ports and said plurality of optical output ports, each of said plurality of optical path switching means having a movable optical reflecting member;

optical inputs from said optical input ports to adjacent ones of said optical path switching means

crossing each other in direction.

40. An optical switch according to claim 39, further comprising reflecting means provided between said plurality of optical input ports and said plurality of optical output ports so as to interpose said plurality of optical path switching means for reflecting light from said optical input ports or light from said optical path switching means.

41. An optical switch comprising:

a plurality of optical input ports;

a plurality of optical output ports; and

a plurality of optical path switching means provided between said plurality of optical input ports and said plurality of optical output ports, each of said plurality of optical path switching means having a movable optical reflecting member;

initial operational conditions of adjacent ones of said optical path switching means for receiving light from said optical input ports being reversed to each other.

42. An optical switch according to claim 41, further comprising reflecting means provided between said plurality of optical input ports and said plurality of optical output ports so as to interpose said plurality of

optical path switching means for reflecting light from said optical input ports or light from said optical path switching means.